

ABSTRACT

THESIS: Drift pumice from New Caledonia: Implications for pollutant distribution in a reef system

STUDENT: Ariel B.E. Stewart

DEGREE: Master of Science

COLLEGE: Sciences and Humanities

DATE: July 2012

PAGES: 88

In 2008 and 2010, exotic drift pumice was collected from a total of 40 beaches around the main island of New Caledonia, Southwest Pacific. This island is enclosed by a barrier reef lagoon whose 2008 designation as a UNESCO World Heritage Site brought attention to the ongoing environmental degradation caused by a century of open cast nickel mining. This type of mining is notorious for producing voluminous fine-grained waste sediment that clogs waterways and may compromise the biodiversity of the lagoon.

This study examines the use of drift pumice as a visual marker of suspended sediment transported within and around the lagoon. The frequent, voluminous pumice eruptions in the region provide ample source material that is fairly durable and highly mobile in water. Geochemical analyses identified two recent eruptions in the central Tonga arc as the source of the pumice, which was transported to New Caledonia by the South Equatorial Current. Pumice abundance was shown to correspond directly with the incoming wave intensity. Coupling pumice distribution data with information about the beach morphology, it is possible to use land-based data collection methods to identify at-risk coastal areas exhibiting elevated fluvial input with reduced marine influence.